Capability Maturity model Integration (CMMI) and Acquisition

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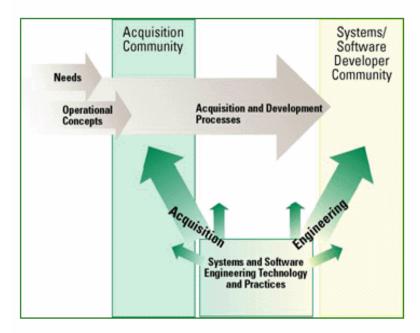
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Acquisition Support Program - About Us

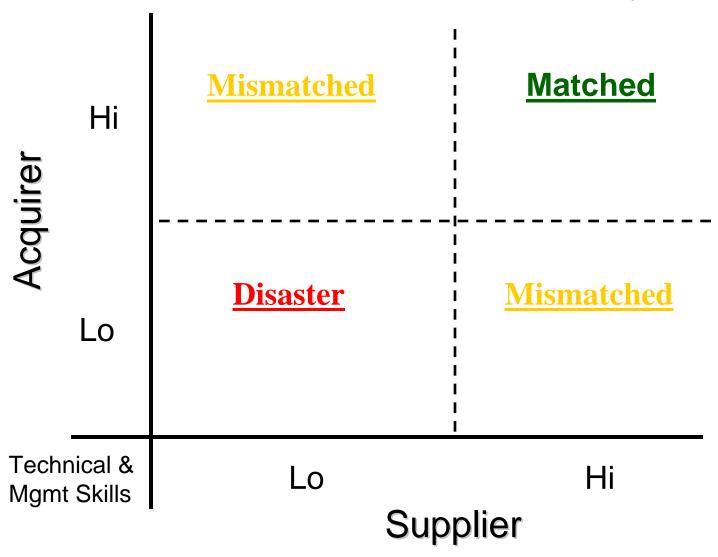
Program Activities | How ASP Can Help | For More Information Purpose

Acquisition program managers are challenged not only to grasp practical business concerns, but also to understand topics as diverse as risk identification and mitigation, selection and integration of commercial off-the-shelf (COTS) components, process capability, program management, architecture, survivability, interoperability, source selection, and contract monitoring. The SEI has spent almost two decades compiling a body of knowledge and developing solutions for these topics.



The vision of the Acquisition Support Program is to facilitate the rapid establishment of agile teams composed of acquirers, developers, and operators using SEI technologies to provide evolutionary, high-quality, cutting-edge software-intensive capabilities to the war-fighter.

Impact of Maturity



CMMI Acquisition Module

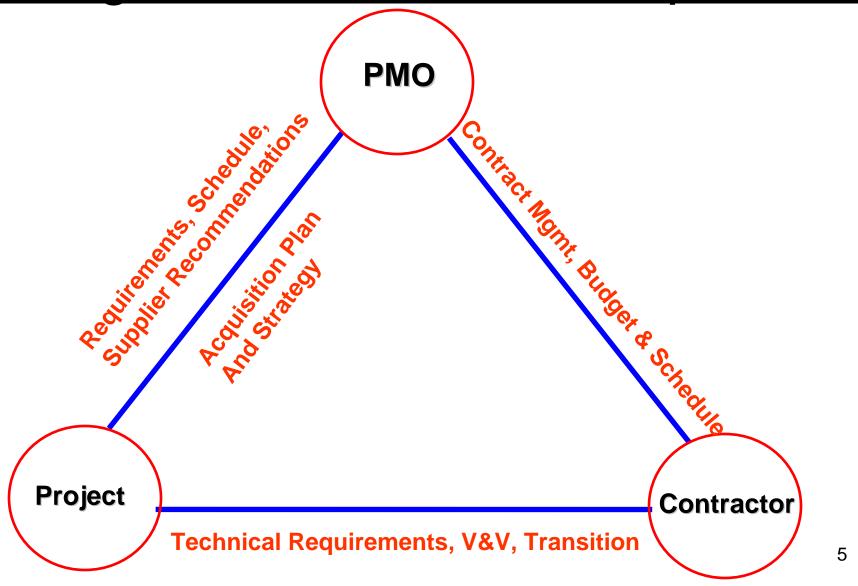
Draws from best practices found in:

- CMMI
- Software Acquisition CMM (SA-CMM)
- Integrated Capability Maturity Model(FAA-iCMM)

To be added to CMMI Version 1.2, Due 8-2006.

Enhances the CMMI to facilitate the integration of The PMO, Project and Contractor in the acquisition process.

Triangle for Success in Acquisition



CMMI Process Categories/ Areas

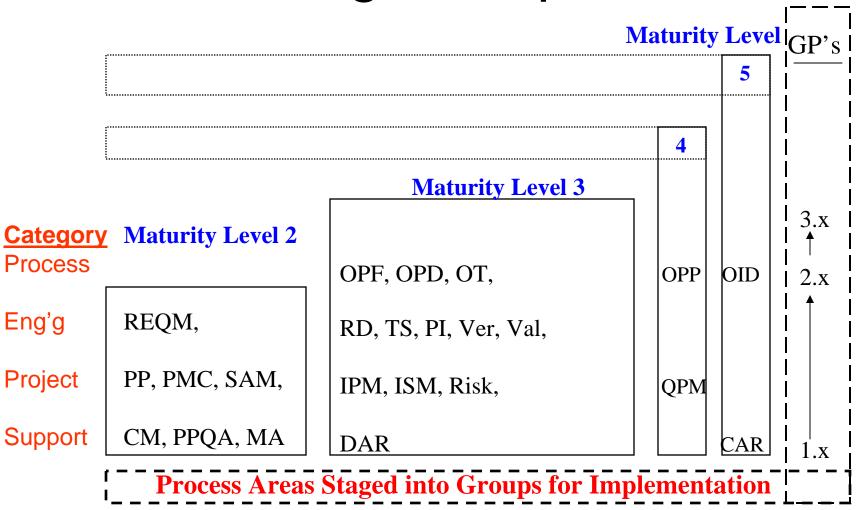
Process Mgmt	Project Mgmt • Proj Planning • Proj Monitoring & Control • Supplier Agreement Mgmt	Engineering • Requirements Mgmt	Support Configuration Mgmt Process & product QA Measurement & Analysis
 Org Process Focus Org Process Definition Org Training 	Integrated Proj MgmtRisk Mgmt	 Requirements Development Technical Solution Product Integration Verification Validation 	 Decision Analysis & Resolution
Org Process Performance	QuantitativeProject Mgmt		
 Org Innovation & Deployment 			Corrective Action& Resolution
	 Integrated Product & Process Development Integrated Teaming 		 Org Environment For Integration
	Integrated Supplier Mgmt		6

Levels

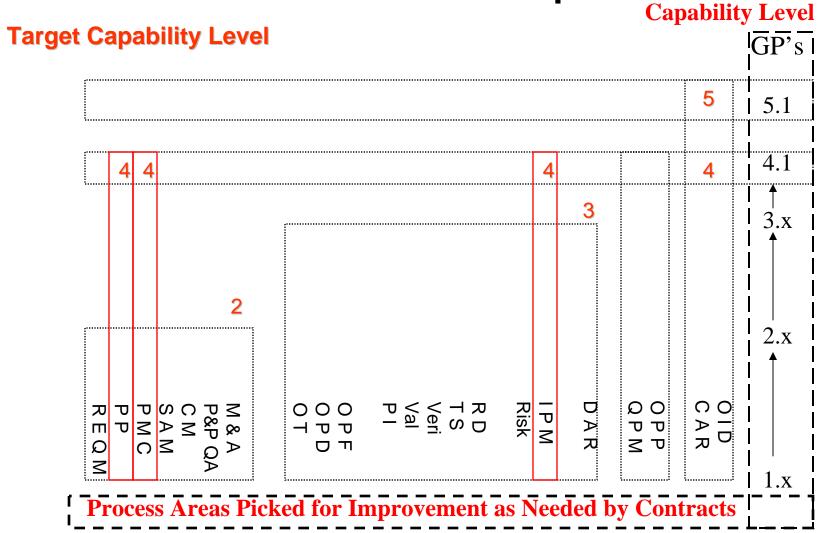
CMMI Levels

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	Process Mgmt	Project Mgmt	Engineering	<u>Support</u>
		Proj Planning	 Requirements 	 Configuration
2		 Proj Monitoring 	Mgmt	Mgmt
		& Control		Process & product
		 Supplier 		QA
		Agreement Mgmt		Measurement &
				Analysis
	 Org Process 	 Integrated Proj 	 Requirements 	 Decision Analysis
	Focus	Mgmt	Development	& Resolution
3	 Org Process 	 Risk Mgmt 	 Technical Solution 	
3	Definition		 Product Integration 	
	 Org Training 		 Verification 	
			 Validation 	
4	Org Process	 Quantitative 		
	Performance	Project Mgmt		
5	 Org Innovation & 			 Corrective Action
	Deployment			& Resolution
		 Integrated Product 		 Org Environment
		& Process		For Integration
IPPD		Development		
=		 Integrated Teaming 		
(0		 Integrated Supplier 		
SS		Mgmt		7

CMMI Staged Representation

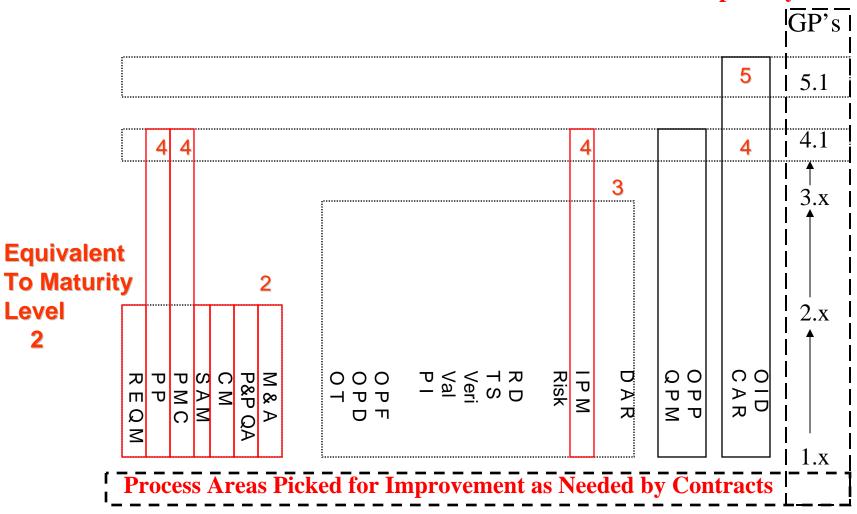


CMMI Continuous Representation



CMMI Equivalent Staging

Capability Level



CMMI Process Deleted in Acquisition Module

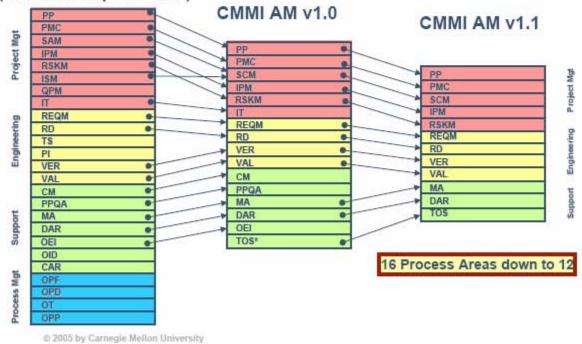
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 Org Process Focus Org Process Definition Org Training 	Integrated Proj MgmtRisk Mgmt	 Requirements Development Technical Solution Product Integration Verification Validation 	• Decision Analysis & Resolution
Org Process Performance	• Quantitative Project Mgmt		
 Org Innovation & Deployment 			Corrective Action& Resolution
	 Integrated Product & Process Development Integrated Teaming 		Org Environment For Integration
	• Integrated Supplier Mgmt		11



Evolution of the CMMI-AM v1.1

CMMI SE/SW/SS v1.1

(Continuous Representation)



CMMI Acquisition Model Process Areas

Process Mgmt	Project Mgmt	<u>Engineering</u>	Support
	Proj PlanningProj Monitoring& Control	• Requirements Mgmt	Measurement & Analysis
	Solicitation& ContractMonitoring	Requirements DevelopmentVerification	• Decision Analysis & Resolution
	Integrated Proj MgmtRisk Mgmt	• Validation	Transition to Operation & Support
			13

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Process Area Format

Process Area

- Purpose
- Specific Goals
- Specific Practices

And there are:

Specific Practices – apply to all PA's

Generic Practices

PRACTICES – that apply to all Process Areas

- 1. E & M an organizational policy for planning and performing the process
- 2. E & M the plan for performing the process
- **3.** Provide **adequate resources** for performing the process, developing the work products, and providing the services of the process
- **4. Assign responsibility and authority** for performing the process, developing the work products, and providing the services of the process
- 5. Train the people performing or supporting the process as needed
- **6.** Place designated work products of the process under appropriate levels of configuration management
- 7. Identify and involve the relevant stakeholders as planned
- **8. Monitor and control the process** against the plan for performing the process and take appropriate corrective action
- **9. Objectively evaluate adherence of the process** against its process description, standards, and procedures, and address noncompliance
- 10. Review the activities, status, and results of the process with higher level management and resolve issues

Project Planning

GOALS	<u>PRACTICES</u>
1. Estimates of project planning parameters Established & Maintained	 1.1 Establish top level WBS to estimate the scope of project 1.2 E & M estimates of attributes of the work products & tasks 1.3 Define project lifecycle phases upon which to scope the plan 1.4 Estimate project effort & cost for work products & tasks
2. Project plan is Established & Maintained	 2.1 E & M budget & schedule 2.2 Identify and analyze project risk 2.3 Plan for management of project data 2.4 Plan for necessary resources to perform project 2.5 Plan for knowledge & skills to perform project 2.6 Plan for involvement of identified stakeholders 2.7 E & M overall project plan content
3. Commitments to project plan Established & Maintained	 3.1 Review all plans affect project to understand project commits 3.2 Reconcile the project plan to reflect available & est. resources 3.3 Obtain commitments from relevant stakeholders to perform & support plan execution

Note: E & M = Establish & Maintain = Document & Use Across organization
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Project Monitoring & Control

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<u>GOALS</u>	<u>PRACTICES</u>
1. Actual performance & progress of project are monitored against the project plan	 1.1 Monitor the actual values of the project planning parameters 1.2 Monitor commitments to those identified in the project plan 1.3 Monitor risks against those In the project plan 1.4 Monitor the management of the project data against the plan 1.5 Monitor stakeholder involvement against the project plan 1.6 Periodically review the project progress, performance & issues 1.7 Review the accomplishments & results of the project at selected milestones
2. Corrective actions are managed to closure when the project's performance or results deviate significantly From the plan	 2.1 Collect & analyze the issues & determine the corrective actions necessary to address the issues. 2.2 Take corrective action on identified issues 2.3 Manage corrective actions to closure

Solicitation, Agreement, Sources

Solicitation & Contract Monitoring	Supplier Agreement Mgmt	Integrated Supplier Mgmt
1. The project is prepared to conduct solicitation.	SG1 Agreement with suppliers are established (E) & maintained (M).	SG1 Potential sources of products that best fit the needs of the project are identified, analyzed, and selected.
1.1 Designate a selection official responsible for making the selection decision.		
1.2 E & M a solicitation package that includes the needs of the acquisition and corresponding proposal evaluation criteria.	SP1.1 Determine type of acquisition for each product or product component to be acquired. Ref: TS PA.	SP1.1 Identify and analyze potential sources of products that may be used to satisfy the projects requirements. <i>Ref: OID PA.</i>

Solicitation Package

Solicitation & Contract Monitoring	Supplier Agreement Mgmt	Integrated Supplier Mgmt
1.3 E & M independently reviewed cost & schedule estimates for the products to be acquired.		
1.4 Validate the solicitation package with end users and potential offerors to ensure the approach and cost and schedules estimates are realistic and can reasonably lead to a usable product.		
2. Suppliers are selected based on the solicitation package.		
2.1 Evaluate proposals according to the documented evaluation criteria.		

Evaluation, Selection, Contract

Solicitation & Contract Monitoring	Supplier Agreement Mgmt	Integrated Supplier Mgmt
2.2 Use proposal evaluation results as a basis to support selection decisions.	SP1.2 Select suppliers based on evaluation of their ability to meet the specified requirements and establish criteria. Ref: DAR, RM PA's.	SP1.2 Use formal evaluation process to determine which sources of custom-made and off-the-shelf products to use. Ref: DAR PA.
3. Contracts are issued based on the needs of the acquisition and the suppliers' proposed approaches.	SP 1.3 E & M formal agreements with suppliers. Ref: RD, RM, PMC.	
3.1 E & M a mutual understanding of the contract with selected suppliers and end users based on the acquisition needs and the suppliers' proposed approaches.	(SP1.3.4 Ensure all parties to the agreement understand and agree to all requirements before implementing the agreement.)	
3.2 E & M communication processes & procedures with suppliers that emphasis the needs, expectations, and measurements of effectiveness to be used throughout the acquisition.		20 Copyright 2005 by Carnegie Mellon Unive

Coordinate, and Monitor Process and product

Solicitation & Contract Monitoring	Supplier Agreement Mgmt	Integrated Supplier Mgmt
4. Work is coordinated with suppliers to ensure the contract is executed properly.	SG2 Agreements with suppliers are satisfied by both the project and the supplier.	SG2 Work is coordinated with suppliers to ensure the supplier agreement is executed appropriately.
4.1 Monitor and evaluate selected processes used by the supplier based on the suppliers' documented processes.	SP2.1 Review candidate COTS products to ensure they satisfy the specified requirements that are covered under a supplier agreement. Ref: RD, ISM-SG1, PP, Risk.	SP2.1 Monitor and analyze selected processes used by the supplier. Ref: Ver, PMC PA's.
4.2 Evaluate selected supplier work products based on documented evaluation criteria.	SP2.2 Perform activities with the supplier as specified in the supplier agreement. Ref: ISM-SG1, PMC PA's.	SP2.2 For custom-made products, evaluate selected supplier work products. Ref: PMC PA.

Change Control, Acceptance, Transition

Solicitation & Contract Monitoring	Supplier Agreement Mgmt	Integrated Supplier Mgmt
4.3 Revise the supplier agreement or relationship, as appropriate, to reflect changes in conditions.	(SP1.3.5 Revise the supplier agreement as necessary.)	SP2.3 Revise the supplier agreement or relationship, as appropriate, to reflect changes in conditions. Ref: SAM SP1.3 PA's.
	SP2.3 Ensure that the supplier agreement is satisfied before accepting the acquired product. Ref: Ver, PMC PA's.	
	SP2.4 Transition the acquired product from the supplier to the project. Ref: PI PA.	

Integrated Project Mgmt

<u>GOALS</u>	<u>PRACTICES</u>
1. The project is conducted using a defined process that is tailored from the organizations set of standard processes	 1.1 E & M the projects defined process 1.2 Use the organizations process assets & measurement repository for estimating & planning project activities 1.3 Integrated the project plan & the other plans that affect the project to describe the project's defined process 1.4 Manage the project using the project plan, other plans that affect the project, and the project's defined process 1.5 Contribute work products, measurements, & documented experiences to the organizational process assets
2. Coordination & collaboration of the project with relevant stakeholders are conducted	 2.1 Manage the involvement of relevant stakeholders in the project 2.2 Participate with relevant stakeholders to identify, negotiate, & track critical dependencies

Risk Mgmt

GOALS	<u>PRACTICES</u>
1. Preparation for risk management is conducted	1.1 Determine risk sources & categories1.2 Define the parameters used to analyze & categorize risks &
	the parameters used to control the risk management effort
	1.3 E & M the strategy to be used for risk management
2. Risks are identified and analyzed to determine their relative importance	 2.1 Identify & document the risks 2.2 Evaluate & categorize each identified risk using the defined risk categories & parameters, & determine its relative priority
3. Risks are handled and mitigated, where appropriate, to reduce adverse impacts on achieving objectives	3.1 Develop a risk mitigation plan for the most important risks to the project, as defined by the risk management strategy3.2 Monitor the status of each risk periodically & implement the risk mitigation plan as appropriate

Requirements Development

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<u>GOALS</u>	<u>PRACTICES</u>
1. Stakeholder needs, expectations, constraints, & interfaces are collected	1.1 Elicit stakeholder needs, expectations, constraints, &
	interfaces for all phases of the product life cycle
& translated into	1.2 Transform stakeholder needs, expectations, constraints, &
customer requirements	interfaces into customer requirements
2. Customer	2.1 E & M product & product-component requirements, which
Requirements are refined and elaborated to develop product & product-component requirements	are based on the customer requirements
	2.2 Allocate the requirements for each product component
	2.3 Identify interface requirements
3. The requirements are analyzed &	3.1 E & M operational concepts & associated scenarios
validated, & a	3.2 E & M a definition of required functionality
definition of required functionality is developed	3.3 Analyze requirements to ensure that they are necessary & sufficient
	3.4 Analyze requirements to balance stakeholder needs &
	constraints
	3.5 Validate requirements to ensure the resulting product will 25
	perform as intended in the user's environment

Requirements Mgmt

GOALS	<u>PRACTICES</u>
1. Requirements are managed & inconsistencies with project plans & work products are identified	 1.1 Develop an understanding with the requirements providers on the meaning of the requirements 1.2 Obtain commitment to the requirements from the project
	 1.3 Manage changes to the requirements as they evolve during the project 1.4 Maintain bidirectional traceability among the requirements &
	the project plans and work products 1.5 Identify inconsistencies between the project plans & work products & the requirements

Verification

<u>GOALS</u>	PRACTICES
1. Preparation for verification is conducted	 1.1 Select the work products to be verified & the verification methods that will be used for each 1.2 E & M the environment needed to support verification 1.3 E & M verification procedures & criteria for the selected work products
2. Peer reviews are performed on selected work products	 2.1 Prepare for peer reviews of selected work products 2.2 Conduct peer reviews on selected work products & identify issues resulting from the peer review 2.3 Analyze data about preparation, conduct, & results of the peer reviews
3. Selected work products are verified against their specific requirements	3.1 Perform verification on the selected work products 3.2 Analyze the results of all verification activities & identify corrective action

Validation

GOALS	PRACTICES
1. Preparation for validation is conducted	 1.1 Select products & product components to be validated & the validation methods that will be used for each 1.2 E & M the environment needed to support validation 1.3 E & M procedures & criteria for validation
2. The product or product components are validated to ensure that they are suitable for use in their intended environment	 2.1 Perform validation on the selected products & product components 2.2 Analyze the results of the validation activities & identify issues

Decision Analysis & Resolution

GOALS	PRACTICES
1. Decisions are based on an evaluation of alternatives using established criteria	 1.1 E & M guidelines to determine which issues are subject to a formal evaluation process 1.2 E & M the criteria for evaluating alternatives & the relative ranking of these criteria 1.3 Identify alternative solutions to address issues 1.4 Select the evaluation methods 1.5 Evaluate alternative solutions using the established criteria & methods 1.6 Select solutions from the alternatives based on the evaluation criteria

Measurement & Analysis

<u>GOALS</u>	<u>PRACTICES</u>
1. Measurement objectives & activities are aligned with identified	1.1 E & M measurement objectives that are derived from identified
	information needs & objectives
	1.2 Measures to address the measurement objectives
information needs	1.3 Specify how measurement data will be obtained and stored
& objectives	1.4 Specify how measurement data will be analyzed & reported
2. Measurement results that address identified information needs & objectives are provided	2.1 Obtain specified measurement data
	2.2 Analyze & interpret measurement data
	2.3 Manage & store measurement data, measurement
	specifications, & analysis results
	2.4 Report results of measurement & analysis activities to all
	relevant stakeholders

Transition to Operations & Support

GOALS	PRACTICES
1. Preparation for transition to operations & support is conducted	1.1 E & M a strategy for transition to operations & support1.2 E & M plans for transitioning acquired products into operational use & support
	1.3 E & M training requirements for operational & support personnel
	1.4 E & M initial & life-cycle resource requirements for performing
	operations & support
	1.5 Identify & assign organizational responsibility for support
	1.6 E & M criteria for assigning responsibility for enhancements
	1.7 E & M transition criteria for the acquired products
2. Transition decisions & actions are executed in accordance with transition criteria	2.1 Evaluate the readiness of the acquired products to undergo
	transition to operations & support
	2.2 Evaluate the readiness of the operational & support personnel to
	assume responsibility for the acquired products
	2.3 Analyze the results of all transition activities & identify appropriate action
	2.4 Report results of measurement & analysis activities to all relevant
	stakeholders

Summary

- The acquisition module allows the organization managing the acquisition to integrate the activities of the acquisition organization, development and contractors.
- The overall goal is the delivery of contracted products and services on-time, within budget with the required functionality.